PUBLIC'S HEALTH

Newsletter for Medical Professionals in Los Angeles County

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An Historical Perspective on World TB Day

World TB Day, an event of international significance, commemorates the discovery of the tuberculosis bacillus by Dr. Robert Koch, physician and Professor of Hygiene at the University of Berlin, Germany. The science of bacteriology owes its origin to two men of genius - Louis Pasteur and Robert Koch. Pasteur may be described as master-architect and Koch as master-builder of the science.

On his birthday in 1876, Koch received a microscope from his wife and immediately set up a primitive laboratory to study infectious diseases. From 1877 to 1880, he laid the foundation of modern bacteriological technique – introducing glass slides and cover slips, examination by hanging drop, fixing and staining of bacteria, culture on solid media by the poured-plate method, micro-photography, and disinfection by steam sterilization. He also demonstrated staphylococci and streptococci as the causes of wound infection.

In August 1881, Koch attended the Seventh International Medical Congress in London where he demonstrated his bacteriological techniques. At that meeting, he was so stimulated by the deliberations on TB that he returned to Berlin determined to find the causative organism of this disease. At that time, TB was responsible for causing one in seven deaths in Europe and the United States. The next year, Dr. Koch presented his findings

on the tubercle bacillus to an astonished audience at the Berlin Medical Society. The date was March 24, 1882.

Probably as important as his work on tuberculosis, for which he was awarded the Nobel Prize in Medicine in 1905, are Koch's postulates - four criteria designed to establish a causal relationship between a microbe and a disease. The postulates were formulated by Koch and Friedrich Loeffler in 1884 and refined and published by Koch in 1890. Koch applied the postulates to establish the etiology of anthrax and tuberculosis, but they have been generalized to other diseases as well. In order to establish the cause of a disease, he stated that:

- The microorganism must be found in abundance in all organisms suffering from the disease.
- The microorganism must be isolated from a diseased organism and grown in pure culture.
- The cultured microorganism should cause disease when introduced into a healthy organism.
- The microorganism must be re-isolated from the inoculated, diseased experimental host and identified as being identical to the original specific causative agent.

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Nutrition and Physical Activity Guidance

The more we learn about nutrition and exercise, the more we recognize their importance in everyday life. Our children need a healthy diet for normal growth and development, and all adults can reduce their risk of chronic disease by adopting a nutritious diet and engaging in regular physical activity.

As reported in the 2002-2003 LA County Health Survey, chronic diseases, such as heart disease, cancer and type II diabetes, account for 80% of premature death and disability in the county. The toll from these diseases on individuals and families is devastating. Education to support Angelenos as they strive to make healthier choices around eating and physical activity is essential. Guidance from health care professionals can support an increase in quality of life and well-being and a decrease in the development of chronic diseases.

The 2005 Dietary Guidelines for Americans and MyPyramid. gov from the United States Department of Agriculture (USDA) are excellent sources of dietary health information.

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THE PUBLIC'S HEALTH



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An Historical Perspective on World TB Day...from page 1

In 1982, on the 100th anniversary of Koch's presentation, the International Union Against Tuberculosis and Lung Disease (IUATLD) proposed that March 24th be officially proclaimed World TB Day. In 1996, the World Health Organization and a wide range of other organizations joined the IUATLD to lend their support and increase awareness of World TB Day.

World TB Day serves as an occasion for people around the world

Today, tuberculosis remains a global health threat. It is estimated that one of every three persons in the world has Latent TB Infection (LTBI). Each day, 4,500 people worldwide die of tuberculosis and 300,000 multidrug-resistance TB cases occur annually.

to raise awareness of this international health threat and to recognize the collaborative efforts of all countries involved in fighting this disease. In the United States, the theme for World TB Day 2009 is "Partnerships for TB Elimination." Action is needed now, beyond our current efforts, to ensure that we reach the goal of TB elimination. Building and strengthening partnerships is one of those actions. This country's progress in controlling TB will not be sustainable without strengthened collaborations with local, state, national, and international partners from all sectors of our society. This action must be taken in order to reach those at highest risk for TB and to identify and implement innovative strategies to improve testing and treatment among high-risk populations.

The CDC and its domestic and international partners, including the National Tuberculosis Controllers Association, Stop TB USA, and the global Stop TB Partnership, are taking many steps to prevent further spread of TB and to reduce the overall burden of the disease. Efforts range from developing new treatment regimens and increasing the capacity of health professionals to provide adequate treatment and issuing new recommendations for improved testing and treatment for U.S. immigrants.

Today, tuberculosis remains a global health threat. It is estimated that one of every three persons in the world has Latent TB Infection (LTBI). Each day, 4,500 people worldwide die of tuberculosis and 300,000 multidrug-resistance TB cases occur annually.¹

In recognition of World TB Day 2009, the Los Angeles County Department of Public Health TB Control Program continues its partnership and collaboration with the TB Coalition of Los Angeles County. During the week of March 23 - 27, 2009, nurses and health educators from the Coalition will staff information tables at selected Ryan White-funded Early Intervention Clinics to inform the public and healthcare professional about TB and it relationship to HIV and AIDS.

For additional information about World TB Day, please contact the TB Control Program at (213) 744-6229.

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World Health Organization: 2007 Tuberculosis Facts available at http://who.int/mediacentre/factsheets/fs104/en/index.html

Drug-resistant TB



Drug-resistant TB is an increasing public health threat, both globally and locally here in Los Angeles County (LAC). A report published by the World Health Organization in February 2008 shows that the worldwide number of cases of drug-resistant TB has reached the highest level ever recorded. With the ever-increasing rate of international migration and travel that characterizes modern times, the U.S., and LAC in particular, will not be immune to this increasing global threat. Indeed, epidemiologic data show that about 80% of TB cases in LAC occur among those who were born outside of the U.S.

In LAC, about 8-10% of TB isolates are resistant to INH and about 1.4% are resistant to both INH and rifampin, which defines Multidrug-Resistant TB (MDR-TB). Extensively Drug-Resistant TB (XDR-TB) is defined to be MDR-TB with additional resistance to a fluoroquinolone and one of the three 2nd-line injectable agents (amikacin, kanamycin, and capreomycin). XDR-TB recently received international attention during an outbreak in KwaZulu-Natal, South Africa, in which 52 of 53 patients with XDR-TB died, most of them within 2 weeks of diagnosis. All of the 44 patients tested for HIV were positive.²

Drug-resistant TB is basically a man-made phenomenon. Wild-type TB strains are thought to harbor minute numbers of mutants that harbor resistance to TB drugs. For example, it is thought that about 1 in 10-6 TB bacilli will harbor mutations that confer resistance to INH. When a population of TB bacilli are exposed to a single TB drug, the susceptible strains will die, but the resistant ones will survive, and with time become the dominant TB population. Indeed, soon after the first antituberculous drug, streptomycin (SM), was put into widespread use as monotherapy in the 1940's, SM-resistant strains already began to emerge.³

Drug-resistant TB is mainly diagnosed by performing phenotypic drug susceptibility testing in culture media. Though this is the most accurate and complete method of testing, it may take several weeks before results are available from the time of specimen collection.

This latter example illustrates the principle of "acquired resistance" in which the TB bacillus acquires drug-resistance on TB treatments that are suboptimal for any of a number of reasons (inadequate TB treatment regimens, non-adherence to therapy). Thus, it is not surprising that in a recent study in California, MDR-TB cases were seven times more likely to report a history of previous TB treatment than non-MDR-TB cases.⁴

Acquired resistance is the basis of the CDC's recommendation that when starting TB treatment, multiple, as opposed to one or two, TB drugs (INH, rifampin, ethambutol, and pyrazinamide) ⁵ be used before susceptibility results are available to prevent the development of drug-resistance since it is highly improbable that there will be a TB bacillus that is resistant to all 4 TB drugs simultaneously. It is also the basis for Directly Observed Therapy (DOT) of TB medicines, provided by the Health Department, which ensures that patients are compliant with their TB treatment by having a health care worker watch the patient take his/her TB pills daily.

Drug-resistant TB is mainly diagnosed by performing phenotypic drug susceptibility testing in culture media. Though this is the most accurate and complete method of testing, it may take several weeks before results are available from the time of specimen collection. Fortunately, there are now more rapid, genetic-based methods of susceptibility testing.

One such method, called the molecular beacon test, is available at the Los Angeles County Public Health Laboratory. The test is performed directly on acid-fast bacilli (AFB) smearpositive respiratory specimens. It can detect the presence of *Mycobacterium tuberculosis complex*, and the mutations that confer resistance to INH and rifampin (sensitivity 83% and 98%, respectively; specificity nearly 100%). The turn around time is one or two days.

It is highly recommended that patients with a prior history of TB treatment (especially non-DOT) and/or from areas of the world with a high prevalence of drug-resistant TB (such as countries of the former Soviet Union, where MDR-TB rates among new cases may be as high as 20% or more) have such rapid resistance testing performed to optimize TB management and prevent further drug resistance acquisition.

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Epidemiologic data show that about 80% of TB cases in LAC occur among those who were born outside of the U.S.

Management of the Non-Compliant TB Patient

Factors Associated With Noncompliance

Someone once noted that tuberculosis is a social disease with medical implications. So true, but what does this really mean? While it is true that tuberculosis disease is caused by the bacillus *Mycobacterium tuberculosis* and can be cured by adherence to a prescribed regimen of anti-TB medications, those of us who work in the field of tuberculosis control are well-acquainted with the powerful sociological, cultural, and psychological factors that often converge to significantly impact an individual's compliance with TB treatment.

We know that major factors associated with non-compliance include many factors such as substance abuse, homelessness, poverty, and unemployment to name a few. The challenge for us as public health professionals is to find a way to achieve our mandate of controlling the transmission of TB while faced with such seemingly insurmountable obstacles.

Addressing Barriers to Compliance

While it is impossible to for us to address every barrier to treatment, we do have very effective means of gaining compliance. Such measures can be viewed along a continuum ranging from the least to the most restrictive.

Starting with the least restrictive measure, all TB patients are educated and counseled about the need and importance of initiating and completing a course of anti-TB treatment. This instruction includes the need to be placed on Directly Observed Therapy (DOT) in which a trained PH employee delivers the medication and/or observes the patient taking the medication in the clinic. A patient may also be given "incentives and enablers" such as food or grocery coupons, bus tokens or passes, and/or housing at TB Control-contracted single-room occupancy motels.

Special Circumstances

Co-morbid conditions and special circumstances can be managed on a limited basis. Two such examples are substance abuse and restrictions on flying. For substance abuse patients, clinic staff can offer inpatient substance abuse treatment at our county-operated facility in Acton, California.





At this center, TB patients can continue their treatment while participating in a 90-day substance abuse rehabilitation program.

For patients who have flown while infectious in the past or who are suspected of planning to fly while infectious, TBC may request that the CDC place the patient on a "Do Not Board" list which prevents the individual from boarding an airplane and may result in the patient being detained at the airport for further evaluation.

Public health investigators (PHI) are a resource unique to the county's public health department. PHIs are personnel who are cross trained in law enforcement and health education. They employ a mixture of emotional support, health education and if necessary, legal measures to ensure timely, successful completion of therapy for patients that have been referred to them. PHI's play an important role in the care of these patients and are often excellent at gaining a patient's compliance through a combination of the development of rapport and stern counseling.

Orders of the Health Officer

If less restrictive measures fail to gain the patient's compliance, the TB Controller may have to take legal action to bring a patient into compliance. Section 121365 of the California Health and Safety Code states that if the "local health officer (TB Controller) determines that the public health or health of a person is endangered by exposure to a person with active tuberculosis or a person who is reasonably believed to have active tuberculosis, then the local health officer may issue any orders deemed necessary to protect the public health and may apply to the court for enforcement of the order." Under this code, the clinician can request TBC to issue what is known as an Order of the Local Health Officer. It is sometimes referred to as a "Legal Order." Under this order, the patient is mandated by law to comply with the instructions contained in the Health Officer Order.

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Management of the Non-Compliant TB Patient...from page 4

The types of written orders that the county TB Controller commonly issues as a means to gain an individual's compliance include an Order for Examination, which is served to a TB suspect who has demonstrated an unwillingness to voluntarily show up at a public health clinic for further evaluation; an Order for Directly Observed Therapy; and an Order for Civil Detention. Note that no orders of the local health officer permit the forcible administration of any medication to any patient against his or her will. As such, individuals who absolutely refuse to take medication may require isolation from the public and this isolation can be indefinite.

Order for Civil Detention

The Order for Civil Detention is the most restrictive order the local health officer can issue as it strictly curtails an individual's personal liberty. The TB Controller may issue an Order of Detention if all other appropriate and available interventions to promote patient adherence have failed. The goal is to ensure the completion of TB treatment and the protection of the public's health and not to punish the patient for noncompliance. The guiding principles and the very specific procedures that are outlined in Sections 121365 through 121369 of the California Health and Safety Code for the civil detention of persistently non-compliant TB patients are designed to protect the rights of the individual and must also be balanced with the legal, ethical, and moral responsibilities of public health officials to protect the public health. As such, the law requires the TB Controller to seek court authorization and enforcement of the order after the order has been served.

Patient behaviors that support a request for a civil order of detention may include, but are not limited to, refusal to adhere to DOT or repeatedly missing DOT, failure to show up for scheduled clinic appointments, threatening to or actually leaving the hospital against medical advice, failure to adhere to infection control precautions, returning to work without authorization (infectious patients) or refusal to submit sputa samples for determination of infectiousness. If a patient elopes from detention, TBC may seek an arrest warrant (the most restrictive form of gaining a patient's compliance) and the patient may be incarcerated for up to 180 days.

Conclusion

Mycobacterium tuberculosis can be cured by adherence to a prescribed regimen of anti-TB medications but strict compliance to the regimen is required. Unfortunately, in many segments of the population, social, cultural, and psychological factors often converge to significantly impact an individual's compliance with TB treatment.

The continuing challenge for Public Health is to manage these factors in our quest to control the transmission of TB.

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Drug-resistant TB...from page 3

The treatment of drug-resistant TB generally requires a longer duration of time and often the use of more toxic and less potent 2nd and 3rd-line TB drugs. This is particularly the case with MDR and XDR-TB. For PZA-monoresistant TB, for example, the duration of treatment may need to be extended from 6 to 9 months. For MDR-TB disease, treatment duration is generally 18-24 months post-culture conversion to negative. XDR-TB is particularly problematic to treat and some cases may prove to be incurable and require life-long respiratory isolation as a result. All cases of MDR/XDR-TB in LAC are managed in close consultation with the MDR-TB Unit and DOT is an absolute must for these patients.

Fortunately, some promising and much needed new TB drugs are anticipated to be available within the next several years, providing some hope against the increasing tide of multidrugresistance. It must be remembered however, that good antibiotic stewardship will be needed to avoid rendering these drugs resistant as well. And so, the battle of man versus microbe continues.

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Brief Report of the TB Burden in Los Angeles County, 2009

The Los Angeles County TB Control Program, in partnership with the Community Health Care Services, California Department of Health Services, and the Centers for Disease Control and Prevention (CDC), continues to advance effective strategies to identify and treat high-risk population groups, including homeless individuals, foreign-born, and persons infected with HIV. This article presents a brief overview of the tuberculosis (TB) disease burden in the county of Los Angeles and contrasts it with data from California and nationally.

As a result of successful public health efforts and strategies to manage TB (identifying and diagnosing new cases, locating contacts to those new cases, and treating latent TB infection (LTBI) and active disease) the number of TB cases in the county has declined steadily since 1992. In 2007, there were 816 confirmed cases of TB in Los Angeles County, representing a 7.9% decrease from 2006 (886 cases) and a 62.9% decrease since 1992 (2,198 cases). This is the fifteenth consecutive year of decline since the peak of the TB epidemic in 1992 and marks the fifth year in a row where the county's TB burden fell below 1,000.² Despite this reduction, however, it would be shortsighted to believe TB is close to the point of eradication.

Los Angeles county accounts for approximately thirty percent of the 2,725 cases of tuberculosis (TB) reported in California, the lowest state case count ever recorded. But unlike Los Angeles County, the rate of decline in the number of cases in California has stalled compared to earlier years. The number of TB cases reported in 2007 was less than two percent below the number of cases in 2006, while the average decline between 2003-2006 was nearly five percent. The case rate has declined 59 percent since the peak of the epidemic in 1992, with a rate of 7.2 cases per 100,000 in 2007; California continues to have the second highest rate of TB in the nation.

During 2007 (the most recent year for which national data are available), a total of 13,299 TB cases (4.4 cases per 100,000 population) were reported in the United States. Both the number of TB cases and the case rate decreased; this represents a 3.3% and 4.2% decline, respectively, compared to 2006. The TB rate in 2007 was the lowest recorded rate since national reporting began in 1953.1

The TB rate among foreign-born individuals remains disproportionately high. In the United States in 2007, 58% of TB cases were foreign-born. In Los Angeles County in 2007, however, 647 (79.3%) cases were foreign-born. In 2007, Hispanics comprised the racial/ethnic group with the largest proportion of cases in the county (358 cases, 43.9%), followed by Asians (329 cases, 40.4%). In California, Asians and Hispanics comprised 46.3% and 36.4% of the total cases in 2007, respectively.³

Targeted interventions for these at-risk populations, continued collaborative efforts toward the global and local fight against TB, and adequate resources are essential to eliminate TB in the county and the world. Over the past two years the Los Angeles County TB Control Program has partnered with

Over the past two years the Los Angeles County TB Control Program has partnered with several community organizations, such as Breathe California and JWCH Institute, to form a TB Coalition that provides education and outreach to at-risk populations in the county. If you would like more information regarding the TB Coalition, please contact Mr. Robert Miodovski at RMiodovs@ph.lacounty.gov.

several community organizations, such as Breathe California and JWCH Institute, to form a TB Coalition that provides education and outreach to at-risk populations in the county. If you would like more information regarding the TB Coalition, please contact Mr. Robert Miodovski at RMiodovs@ph.lacounty.gov.

The burden of TB around the world has continued to increase and the public health infrastructure continues to be threatened by funding reductions. Success locally and abroad can result in complacency and resurgence of disease if aggressive public health efforts to detect and treat TB in population subgroups are not maintained.

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Nutrition and Physical Activity Guidance...from page 1

Based on the latest scientific evidence, the Dietary Guidelines and MyPyramid.gov provide assistance and advice for choosing a nutritious diet, maintaining a healthy weight, achieving adequate exercise, and keeping foods safe to avoid food-borne illness.

The 2005 Dietary Guidelines for Americans describe a healthy diet as one that:

- Emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products.
- Includes lean meats, poultry, fish, beans, eggs, and nuts.
- Is low in saturated fats, trans fats, cholesterol, salt (sodium), and added sugars.

Copies of the Dietary Guidelines and additional resources for healthcare professionals are available to download or for purchase at: http://www.health.gov/dietaryguidelines/dga2005/toolkit/.

When it comes to dietary advice, one size does not fit all. At MyPyramid.gov, individuals can access an on-line, interactive tool to plan and assess their food choices and provide personalized advice to help them, based on their age, gender, height, weight and activity level. It is free and user-friendly. MyPyramid.gov teaches individuals to:

- Make smart choices from every food group.
- Find a balance between food and physical activity.
- Get the most nutrition out of their calories.
- Stay within their individual daily calorie needs.

In addition, MyPyramid.gov offers additional educational resources for health care professionals, as well as downloadable brochures and posters for use with patients. To access the website, visit: www.mypyramid.gov.

The recommendations in the Dietary Guidelines and in MyPyramid are for the general public over 2 years of age. MyPyramid is not a therapeutic diet for any specific health condition. Individuals with chronic health conditions should continue consulting with their health care team to determine what dietary pattern is appropriate for them.

For additional free nutritional and physical activity resources from the Los Angeles County Nutrition Program website, click on "Links" under the Resources section at http://publichealth. lacounty.gov/nut/index.htm. Here, you'll find information and resources on a number of topics including Child and Adolescent Nutrition, Food Safety, Nutrition and Physical Activity for the Older Adult, Obesity and related topics and research.

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General nutrition guidance from MyPyramid.gov:

- Make half your grains whole.
- Vary your veggies.
- Focus on fruit.
- Get your calcium rich foods.
- Go lean with protein.
- Find your balance between food and physical activity.
- Keep food safe to eat.

How Much Physical Activity Do You Need?*

- For good health, MyPyramid recommends at least 30 minutes of physical activity most days, preferably daily.
- To prevent weight gain, many people need about 60 minutes of physical activity on most days.
- To keep off lost pounds, many people need about 60-90 minutes of physical activity daily.
- Children and adolescents need 60 minutes of physical activity daily, or most days.
- * For health benefits, physical activity should be moderate to vigorous in intensity.



Physician Registry

Become a Member of the Health Alert Network

The Los Angeles County Department of Public Health urges all local physicians to register with the Health Alert Network (HAN). By joining, you will receive periodic email updates alerting you to the latest significant local public health information including emerging threats such as pandemic influenza. Membership is free. All physician information remains private and will not be distributed or used for commercial purposes.

Registration can be completed online at www.lahealthalert.org or by calling 323-890-8377.

Be aware of public health emergencies! Enroll now!

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Newsletter for Medical Professionals in Los Angeles County



Selected Reportable Diseases (Cases) ¹ — OCT 2008								
	THIS PERIOD OCT 2008	SAME PERIOD LAST YEAR OCT 2007	YEAR TO DATE –AUG/SEPT		YEAR END TOTALS			
Disease			2008	2007	2007	2006	2005	
AIDS ¹	236	110	1,448	1,181	1,413	1,347	1,498	
Amebiasis	9	6	95	97	122	94	114	
Campylobacteriosis	78	49	896	738	827	775	725	
Chlamydial Infections	3,894	3,720	36,693	34,592	40,935	39,876	38,862	
Encephalitis	7	0	63	44	65	46	72	
Gonorrhea	750	809	7,033	7,874	9,319	10,430	10,494	
Hepatitis Type A	0	2	48	66	78	364	480	
Hepatitis Type B, acute	3	6	52	45	52	62	57	
Hepatitis Type C, acute	0	0	1	1	6	4	3	
Measles	0	0	1	0	0	1	0	
Meningitis, viral/aseptic	68	11	517	279	395	373	527	
Meningococcal Infect.	1	0	30	21	24	46	37	
Mumps	0	0	7	4	5	10	10	
Pertussis	6	1	60	49	69	150	439	
Rubella	0	0	1	0	0	0	1	
Salmonellosis	660	67	1,366	928	1,081	1,217	1,085	
Shigellosis	42	50	431	415	463	524	710	
Syphilis (prim. and sec.)	54	89	587	727	846	789	644	
Syphilis Early latent	53	65	618	688	794	764	570	
Tuberculosis	94	99	556	555	816	885	906	
Typhoid fever, Acute	0	0	12	12	17	17	12	

^{1.} Case totals are provisional and may vary following periodic updates of the database.